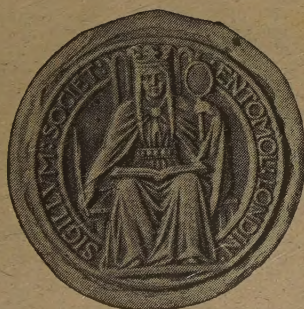


VOL. VII, Part I.

30th June, 1932.

THE  
PROCEEDINGS  
OF THE  
ENTOMOLOGICAL SOCIETY  
OF  
LONDON



LONDON:  
PUBLISHED BY THE SOCIETY AND  
SOLD AT ITS ROOMS, 41, QUEEN'S GATE, S.W. 7

---

[Price 6s. 0d.]



# THE ENTOMOLOGICAL SOCIETY OF LONDON

Founded, 1833. Incorporated by Royal Charter, 1885.

PATRON—HIS MAJESTY THE KING.

## OFFICERS and COUNCIL for the SESSION 1932-1933.

H. ELTRINGHAM, M.A., D.Sc., F.R.S., *President*.

SIR T. HUDSON BEARE, B.Sc., F.R.S.E.

R. W. LLOYD.

SIR GUY A. K. MARSHALL, C.M.G., D.Sc., F.R.S. }

*Vice-Presidents.*

CAPT. A. F. HEMMING, C.B.E., F.Z.S., *Treasurer*.

S. A. NEAVE, M.A., D.Sc., F.Z.S., *Secretary*.

F. J. GRIFFIN, A.L.A., *Registrar*.

### *Council.*

H. W. ANDREWS.

CAPT. E. BAGWELL-PUREFOY, F.Z.S.

K. G. BLAIR, B.Sc.

G. H. CARPENTER, D.Sc., M.R.I.A.

H. ST. J. K. DONISTHORPE, F.Z.S.

MAJ. R. W. G. HINGSTON, M.C.

A. D. IMMS, M.A., Sc.D., F.R.S.

MISS C. LONGFIELD.

PROF. E. B. POULTON, M.A., D.Sc., F.R.S.

O. W. RICHARDS, M.A.

V. B. WIGGLESWORTH, M.A., B.Ch., M.D.

### *Finance and House Committee.*

R. W. LLOYD (Chairman).

R. ADKIN.

H. W. ANDREWS.

SIR T. HUDSON BEARE, B.Sc., F.R.S.E.

E. C. BEDWELL.

K. JORDAN, Ph.D., F.R.S.

O. W. RICHARDS, M.A.

### *Publication Committee.*

SIR GUY MARSHALL, C.M.G., D.Sc., F.R.S. (Chairman).

H. ST. J. K. DONISTHORPE, F.Z.S.

M. E. MOSELY.

PROF. E. B. POULTON, M.A., D.Sc., F.R.S.

N. D. RILEY, F.Z.S.

B. P. UVAROV.

V. B. WIGGLESWORTH, M.A., B.Ch., M.D.

### *Library Committee.*

A. D. IMMS, M.A., Sc.D., F.R.S. (Chairman).

P. A. BUXTON, M.A.

L. G. HIGGINS, M.A., F.R.C.S.

R. W. LLOYD.

W. H. T. TAMS.

H. J. TURNER.

H. WILLOUGHBY ELLIS, F.Z.S.

### *Committee for the Protection of British Insects.*

RT. HON. LORD ROTHSCHILD, D.Sc., F.R.S. (Chairman).

R. ADKIN.

CAPT. E. BAGWELL-PUREFOY, F.Z.S.

W. J. DOW.

J. C. F. FRYER, M.A.

COL. F. A. LABOUCHERE.

N. D. RILEY, F.Z.S.

W. G. SHELTON, F.Z.S.

H. M. EDELSTEN (Secretary).

The Executive Officers are *ex officio* members of all Committees.

## TRANSACTIONS AND PROCEEDINGS OF THE SOCIETY.

Some of the early volumes of the Society's Transactions are out of print. Any single volume of the years 1868-1887, is sold at 10s. to Fellows. The volumes for 1868-1900, in sets of not less than five, as well as the five of the Third Series (1862-1867), can be obtained by Fellows at greatly reduced prices on application to the Secretary. The following is a price list of recently published parts of the TRANSACTIONS—

1930.—Transactions, Vol. LXXVIII: Part I, £1 10s. 0d., to Fellows, £1 2s. 6d.; Part II, £2 2s. 0d., to Fellows, £1 11s. 6d.

Proceedings, Vol. V: Part I, 4s. 0d., to Fellows, 3s. 0d.; Part II, 6s. 0d., to Fellows, 4s. 6d.; Part III, 6s. 0d., to Fellows, 4s. 6d.

1931.—Transactions, Vol. LXXIX: Part I, £1 1s. 0d., to Fellows, 15s. 9d.; Part II, £1 10s. 0d., to Fellows, £1 2s. 6d.; Part III, £1 16s. 0d., to Fellows, £1 7s. 0d.

Proceedings, Vol. VI: Parts I-III, 6s. 0d. each, to Fellows, 4s. 6d. each.

1932.—Transactions, Vol. LXXX: Part I, 18s. 0d., to Fellows, 13s. 6d.

Proceedings, Vol. VII: Part I, 6s. 0d., to Fellows, 4s. 6d.

### STYLOPS.

1932.—Stylops, Vol. I, subscription rate £1 4s. 0d., to Fellows, 16s. 0d.; monthly parts 3s. 0d. each, to Fellows, 2s. 0d.



## THE SOCIETY'S CENTENARY, 1833-1933.

The Council of the Society have had under consideration the question of how best to celebrate the completion of the first hundred years of the Society's existence. So important a landmark in the history of the Society forms a fitting opportunity for reviewing the achievements of the past, and the Council have decided to issue free of charge to all Fellows of the Society in connection with the Centenary Celebrations an illustrated volume containing an authoritative account of the foundation of the Society, its subsequent growth, its incorporation by Royal Charter, and the many-sided developments of recent years. This will, in their view, constitute not only a valuable record of past progress, but will serve also to point the way to new lines of advance.

The Council are anxious that the Centenary Celebrations should themselves be the occasion of a further development in the work of the Society, and they have decided to this end to establish a special fund to be known as the Centenary Fund. They propose that the cost of the Centenary Celebrations (including that of producing the proposed Centenary Volume) should be defrayed from this Fund, and that the balance should be constituted into a permanent Trust Fund to be used at the discretion of the Council, who, subject to the terms of the Trust, will be free to employ either the capital or interest of the Fund for the furtherance of entomology in any way that they may think desirable, provided only that the Fund is not to be used to relieve the general revenue of the Society from existing liabilities in regard either to the publications or to the Library of the Society. The Council cannot anticipate the precise way in which the Fund will be used, but they have in mind the payment of grants therefrom towards the cost of papers which otherwise it would be impossible to accept for publication in the *Transactions*, the publication, in approved cases, of individual works on entomology, or the purchase for the Library of books which owing to their great cost it would be impossible to buy from the annual Library Grant. The Centenary Fund will be credited with any sums that may be received from the sale of individual works the whole cost of which may have been defrayed from the Fund.

The Council are confident that the Fellows of the Society will welcome an opportunity of contributing to the Centenary Fund, subscriptions to which will be announced from time to time in the *Proceedings*. Payments may be made either by cheque or Money Order, which should be clearly marked "Centenary Fund," and made payable to the Treasurer, Entomological Society of London, at 41, Queen's Gate, London, S.W. 7, or, where payment over a period is desired, direct through a banker on the form attached hereto, which, when completed, should be forwarded to the Treasurer.

H. ELTRINGHAM President.  
A. F. HEMMING Treasurer.  
S. A. NEAVE Secretary.

### ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, South Kensington, S.W. 7.

Date.....

To Messrs. ....

..... Bankers.

Please pay to Messrs. Coutts & Co., 15, Lombard Street, London, E.C., for the credit of the account of the Entomological Society of London (Centenary Fund) the sum of £..... in ..... instalments of £..... each at intervals of ....., the first instalment to be paid on .....

Signature of Fellow.....

Address .....

TWO PENNY  
STAMP



THE PROCEEDINGS  
OF THE  
ENTOMOLOGICAL SOCIETY  
OF LONDON

VOL. VII.

1932.

Wednesday, February 3rd, 1932.

Dr. H. ELTRINGHAM, F.R.S., President, in the Chair.

*Vice-Presidents.*

The PRESIDENT announced that he had nominated Sir THOMAS HUDSON BEARE, B.Sc., F.R.S.E., Mr. R. W. LLOYD, and Sir GUY A. K. MARSHALL, C.M.G., D.Sc., F.R.S., as Vice-Presidents for the year.

*Election of Fellows.*

Lt.-Col. C. G. NURSE, of Redcote, Rusthall Park, Tunbridge Wells, was elected a Special Life Fellow, and Mr. W. K. FORD, of the Citrus Experimental Station, Mazoe, Southern Rhodesia, was elected a Fellow of the Society.

*Exhibits.*

**Some Butterflies of the West Indies.**

Mr. W. J. KAYE exhibited some butterflies from Jamaica, including (1) *Junonia genoveva* with the outer half of all four wings eaten off, presumably by lizards or birds. The specimen was actually caught flying, although, owing to its greatly mutilated condition, its identity was not suspected. It resembled on the wing a butterfly only half the size of *genoveva*, and with all the eye-marks eaten off its appearance was completely changed. (2) Both sexes of *Dynamine zetes* and the male of *Lucinia cadma* to demonstrate that the undersides of these two species with their wings folded are remarkably alike, this being undoubtedly a case of mimicry as already recorded in 1931, *Trans. Ent. Soc. Lond.*, 79: 532. The *Dynamine* is most probably the model, as it is much commoner than the *Lucinia*. It is still, however, a puzzle why the *Dynamine* should have a very dimorphic ♀ in Jamaica, where there are no species of its pattern that could possibly form a model for it. (3) *Phyciodes pelops aegon* and *P. proclea*, belonging to a specialised section of the genus, and both exceedingly local. The former also occurs in Cuba, Hispaniola and Porto Rico, but the latter is peculiar to Jamaica. *P. pelops* is probably the smallest known Nymphaline and measures barely 20 mm.



### The occurrence of *Dismorphia spio* in Porto Rico.

Mr. W. J. KAYE also said that in his notes on *Heliconius charithonia* and its mimics (1930, *Proc. Ent. Soc.*, 5: 89), the statement that "In Porto Rico no record had been found of a *Dismorphia*," should have read "In Porto Rico no specimen had been found" (i.e. in any collection). *Dismorphia spio* has been recorded from Porto Rico by several writers: Dewitz in "Tagschmetterlinge von Porto Rico" in 1877, *Stett. Ent. Ztg.*, 38: 234; Moeschler, 1889, *Die Lepidopteren Fauna von Porto Rico*, p. 91, and Gundlach, 1881, in *Contrib. à la Entomologia Cubana*, p. 81, where he says, "*Leptalis spio* y como yo conozco bien la especie portorriqueña" ("*Leptalis spio* I know well as a Porto Rican species"). There are also several records of its occurrence in 1924, Wolcott, *Insectae Portoricensis*, J. Dept. Agric. P. Rico, 7. The species appears to be not uncommon in the mountainous region of the eastern end of the Island.

### The Silk Tents spun by a Millepede.

Mr. HUGH MAIN gave a short account of some recent observations on the habits of *Polymicrodon polydesmoides* (Leach), illustrated by lantern slides and specimens. He said that in August 1931 he had found on the underside of a piece of wood in his garden a silken structure enclosing a millepede. Further search yielded more examples and a number of the free millepedes. Some of the latter spun similar structures in captivity. Continued observations revealed some of the details of the habits of the creatures which do not appear to be too well known. He found that after enclosing itself in a flattened dome-shaped tent it shortly afterwards sloughed off its skin. Following a short rest, probably to allow the new skin to harden, it consumed the empty skin and finally ate the silk tent and so set itself free. Later on pairing was observed. Subsequently another silk structure shaped like a flat conical bell tent was produced which enclosed a cluster of eggs.

The millepedes had been kindly identified by Dr. S. G. Brade-Birks.

A full account, with illustrations, has been published in 1932, *Essex Nat.*, 23: 203-206.

### Ancient Workings of Insects, perhaps Bees, from Megiddo, Palestine.

Dr. P. A. BUXTON said that in the summer of 1931, Mr. P. L. O. Guy, of the Oriental Institute of the University of Chicago, discovered some remains, apparently of insect workings, in a subterranean tunnel which he had just opened in Megiddo in Palestine. Dr. Buxton had the opportunity of seeing the remains *in situ* and removing some of them. They appear to have considerable interest from the point of view of association, though their scientific value is reduced because one cannot assign them to any particular insect.

The place in which they were found was an artificial cave which had been made in the Bronze Age or earlier; it was a tunnel which descended obliquely through undisturbed chalk until it reached a permanent source of water. The cave, which was apparently entirely artificial, was straight and roughly cylindrical. Its diameter was not measured but was perhaps 5 metres. The insect remains were all found about 17 metres from the mouth; at this point the sky was clearly visible and there was a considerable amount of diffused daylight. All access to the place

where the remains were found had been cut off by a blocking wall: this was very well made, and it completely closed the cave not only to man but to insects. As to the date of these works, the following words are quoted from a letter from Mr. Guy, with his permission:—

“As to dating, I am of the opinion that the large cave in which we found the things was made some time during the Bronze age, *i.e.* before 1200 B.C., but I have not so far got any evidence which permits me to say how much before that date and am thus unable to give you a higher limit to their age. The lower limit is, I think, fairly sure, for I believe that the blocking wall was built across the mouth of the cave by the order of King Solomon, when he rebuilt and fortified Megiddo about the middle of the tenth century B.C.”

It is to be understood that after the building of the wall, apparently in the time of King Solomon, the cave was completely shut off until the summer of 1931.

The insect remains are of two types. A number of small, cylindrical, mud nests were found on a shelf on the side of the cave. In their original position they were vertical, the base covered in mud, but the upper end of the nest standing up above it. None of them is quite complete, but the length was apparently 25–30 mm., the internal diameter 5·5–6·5 mm., and the thickness of the wall 3–4 mm. The wall is rough and looks as if it had been built up of pellets of mud; the inner surface is smooth but not polished. Above the mud nests, in the roof of the cave, there were large numbers of tubular burrows in the natural chalk. At the time when I excavated them, they were about 4 inches long, but it is certain that the surface of the cave had gradually fallen away and that they had originally been longer. The burrows were 6·5 mm. in diameter and were frequently branched. On their inner walls may still be seen transverse crescentic grooves, apparently made by the mandibles of the insects which excavated them. They terminated in a chamber with a rounded end and an especially smooth wall; the difference between the rough inner surface of the burrow and the polished chamber is most striking. These burrows occurred in large groups, some of the colonies consisting of more than 100 burrows and being a yard in diameter. The whole of the cave was extremely damp, and no trace of organic remains has been preserved either in the mud nests or in the tubular burrows in the chalk.

The material has been examined by a number of British entomologists, also by L. Berland of Paris and H. Bischoff of Berlin. Most people accept the view that both workings are made by Hymenoptera, which was my own view when I collected them. There is, however, the possibility that they are made by Coleoptera (see Mr. Blair's remarks below). In favour of the view that the structures were made by Hymenoptera is their general appearance and the fact that the burrows are apparently colonial. Rather against this view is the fact that they were found so far from actual daylight, but in the bright climate of Palestine the light at the position where the burrows were found may have been sufficient for Hymenoptera. The view put forward by Dr. Bischoff is that both types of working were made by the same species. He holds that the insect which tunnelled in the chalk also tunnelled in some deposits of mud at a lower level in the cave; all the workings in the mud have been destroyed in the course of time except the terminations of the burrows, which were fortified by the saliva of the insects. This left them



standing up above the surface when the rest of the mud disappeared. My own feeling is against this view. It seems improbable that the same species would terminate its burrow either with a smooth cell, excavated in chalk, or with a cell lined with pellets of mud. The fact that the burrows are branched suggests that they were made by some bee, possibly a species of *Osmia* or *Anthophora*.

The specimens, and a flashlight photograph of the roof of the cave, provided by the kindness of the archaeologists, have been deposited in the British Museum (Natural History). The insects concerned cannot be identified at present. But it might be easy to do so, if any one with a competent knowledge of the Hymenoptera of Palestine studies them at a later date.

Mr. K. G. BLAIR, while not denying the possibility that the burrows were of Hymenopterous origin, considered that the situation was a very improbable one for a colony of these sun-loving insects, and suggested the alternative theory that they might be the work of Coleoptera. He remarked that the larvae of many species of beetles when fully fed were known to burrow into various hard substances, wood and even lead, in their construction of a suitable pupation chamber. In some respects the burrows in question recalled a colony of pupation cells of *Ocypus ater* found by the speaker in the vertical face of bands of chalk rock in the sea cliffs near Branscombe, S. Devon (vide 1931, *Ent. Mon. Mag.*, 67: 247), but in the Megiddo instance the burrows were longer and the chalk was softer. In this case it was perhaps the work of some species of SILPHIDAE or other carrion feeder, if at some time a carcase had lain in the cavern. Even so it was difficult to account for the borings being in the roof instead of in the floor of the cavern, but possibly the chalk was softer here than on the floor and sides. He was of the opinion that in the absence of organic remains in the cells the only chance of definite identification of the makers of the burrows was the finding of a similar instance of the present day. If Hymenoptera were the authors of the work this should not be difficult, but if they were beetle larvae the fortuitous concurrence of circumstances, cave, carcase and season, was likely to be of rarer occurrence.

Dr. BUXTON replied that the skeleton of a human being had been found on the floor of the cave, immediately under the insect remains.

### ***Vespa adulterina* (Buyss.), a Cuckoo Wasp.**

Mr. O. W. RICHARDS said Du Buysson in 1907 described a variety *adulterina* of *V. norvegica*, F. Bischoff (*Biologie der Hymenopteren*, 1927, p. 404) suggested that this variety was really a distinct species, parasitic on *V. norvegica*. Specimens collected by the Oxford University Expedition to Lapland (1930) and by himself in Austria bear out Bischoff's contention. Workers have not been discovered, and the structure of the clypeus of the female (*adulterina*) differs from that of its host (*norvegica*) in the same way that the clypeus of *V. austriaca*, Pz., differs from that of its host, *V. rufa*, L. At any rate *V. adulterina* (Buyss.) is a distinct species of which males and females are now known.

### **A new species of *Microstigmus* (Hymenoptera, Sphecoidea).**

Mr. O. W. RICHARDS said that Ducke described this genus in 1907 for a single species, *M. theridii*, Ducke, which he supposed was a parasite in a spider's nest.



Myers (1929) has shown that two species in Trinidad build hanging nests of plant-fibre, somewhat resembling spiders' web. The genus is also unique in preying on Collembola. A new species, captured by Maj. Hingston when with the Oxford University Expedition to British Guiana (1929), was exhibited, with its nest.

***Leptofoenus*, a synthetic Hymenopteron.**

Mr. O. W. RICHARDS also exhibited a remarkable insect (from Panama) which Smith described in 1862 as *Leptofoenus peleciniiformis*. Hitherto the type appears to have been the only specimen known. On the O.U. Exp. British Guiana (1929), Maj. Hingston captured a second female, found 100 ft. up a tree. In structure the genus combines certain features of the GASTERRUPTIONIDAE, STEPHANIDAE and PELECINIDAE with a number of peculiar characters. Brues (1924) places it in the family CLEONYMIDAE, which includes some of the most aberrant Chalcidoids.

**Notes on African Acraeas.**

Dr. G. D. HALE CARPENTER exhibited and made remarks on the forms of *Acraea johnstoni* and their geographical variation, and on the distinction between *Acraea stenobea* and *A. lygus*.

**The Geographical races of the African Acraeine butterfly *Planema epaea*, Cramer.**

Prof. POULTON exhibited a series of *Planema epaea* kindly lent to him by Col. R. H. Ratray. The eight specimens had been selected from a larger number collected by Major F. Moysey, F.E.S., at Lotti (3000 ft.), to the S.W. of the Acholi Hills south of the Imatong Range, Mongalla Prov., S.E. Sudan, near the Uganda border. With these were exhibited examples of the W. Coast, Uganda, and Abyssinian races of *epaea*.

Six of the Sudan butterflies were taken between 8 and 13 July, 1930, two on the dates recorded below. The series exhibits remarkable variation, connecting the W. Coast race *P. e. epaea*, on one side with the Uganda race *P. e. paragea*, Gr. Sm., on the other with the Abyssinian *P. e. homochroa*, Rothsch. The difference in pattern between *epaea*, with sexes unlike and *paragea* with sexes alike, is clearly shown in *Proc. Ent. Soc. Lond.*, 1925: pl. D, fig. 1 ♂, fig. 3 ♀ of *epaea*, fig. 5 ♀ of *paragea*, while the difference between these two races and *homochroa*, with sexes alike and resembling the ♂ *epaea* (fig. 1) may also be inferred. Hence, in the Abyssinian race, the pattern of the female *epaea* is lost while in the Uganda race that of the male, both sexes retaining the female pattern, although in a much darkened form with reduced markings.

Of the exhibited specimens three males were transitional towards *paragea*, the orange colouring being much paler over the areas corresponding to the yellowish markings of the latter, and in the hind-wing, the orange (except for the pale basal band) being darkened in one specimen and replaced by fuscous in the two others. These latter, except for the pale orange tinge of the markings, approach very closely to *paragea*. In one female the F.W. bar is faintly yellow as are the other markings of both wings, differing from *paragea* in their greater breadth and the pale yellowish tint of the H.W. beyond the basal band; but the difference is not wide and the specimen is obviously transitional between the two races, a transition carried further in another female (March 1930) which may be described as a

*paragea* with the markings unusually defined and prominent. Thus these 3 males and 2 females exhibited a series of intermediate forms between *P. e. epaea* and *P. e. paragea*.

Of the three remaining *Planemas* a male closely resembled the W. Coast *e. epaea* and the Abyssinian *e. homochroa*. One of the females (29 June, 1930) differed from the specimen first described in the slightly yellower F.W. bar and the orange tinge of the other markings, thus approaching *homochroa*, the transition being carried further by a second female in which all markings except the F.W. bar are of a still deeper orange. It is to be noted that in the female *homochroa* the tint of the orange marking which represents the white F. and H.W. band of the female *e. epaea* is distinctly paler than that of the H.W. surface beyond the cell. This marked difference in tint, very evident in the exhibited female taken 6 Feb. 1927 by H.E. Sir Arnold Hodson at Manta Bacchi in S.W. Abyssinia (5950 ft.), was clearly reminiscent of the white markings of the female *epaea*, intermediate stages being provided by the two last-mentioned females collected by Maj. Moysey. Dr. Karl Jordan had kindly informed him that the females of *P. e. homochroa* in the Tring Museum exhibited a similar paleness of the orange tint over the same area.

#### The Geographical Races of *Charaxes ansorgei*, Rothsch., and their Mimetic Associations.

Prof. POULTON said that his friend Dr. V. G. L. van Someren had written 25 Oct. 1931 and called his attention to the fact that in Kenya Colony and N.E. Uganda "there are two distinct geographical races of *ansorgei*, one extending from the Elgon, Transzoia area to Nandi and Lumbwa, a rich form with both pale and black marks clearly defined; the other a race extending from the Aberdares through the Uplands Kikuyu Escarpment area to Mt. Kenia. In the first race the females are very male-like, *i.e.* they have pale orange in the fore-wing bar; in the second the fore-wing bar is cream or whitish." Dr. van Someren also informed him that the difference between these races, one on the W. and the other on the E. of the Rift Valley, had been first observed by Mr. T. H. E. Jackson of Kitale, after an inspection of the extensive material in the Nairobi Museum. The type of *Charaxes ansorgei* was described by Lord Rothschild (1897, *Nov. Zool. Tring*, 4: 181-2; 1898, *ibid.*, 5: pl. V, fig. 2) from a male collected by Dr. Ansorge, 11 Dec., 1896, at Patsho, Nandi. Hence the more western form becomes *Charaxes ansorgei ansorgei*, although the female erroneously associated with it was that of the eastern race, described by A. G. Butler in 1900, *Proc. Zool. Soc.*, 1900: 915, and accepted by Dr. V. G. L. van Someren and Canon K. St. Aubyn Rogers in their excellent account of the life-history and habits of this subspecies in 1928, *J. E. Afr. and Uganda Nat. Hist. Soc.*, 31 and 32: 153-156, pl. lxxi.

*Charaxes ansorgei* was such a striking and beautiful species and so rare in collections that it seemed appropriate to give some account of its geographical races so far as the scanty material would permit. In this attempt the kindest help has been received from the British Museum, the Witley and Tring Museums, and from Mr. H. L. Andrewes, Dr. G. D. Hale Carpenter, Mr. P. I. Lathy, Mr. Levick, Col. R. H. Rattray and Dr. V. G. L. van Someren.



1. *The W. Kenya and N.E. Uganda Race—C. a. ansorgei*, Rothsch.—Dr. V. van Someren's and Canon St. Aubyn Rogers' detailed account of *ansorgei* had been evidently written after an intimate experience of the eastern race and it was therefore interesting to add some observations made upon the western *a. ansorgei*.

Mr. H. L. Andrewes, F.E.S., with a long experience at Lumbwa up to eleven years ago, had kindly written on 26 January, 1932 :—"Lumbwa station is at mile 521 on the Uganda Rly. I was living on the N. side about six miles from the station (6339 ft.), but worked from about 6500 to 7500 ft. The locality is, as you say, on the W. slope of Mau Escarpment in very hilly country, and 15 to 20 miles in a direct line W. of the Mau summit (8322 ft.) on the railway. In clear weather the Kavirondo Gulf of the Victoria Nyanza could be seen from high ground some 50 or 60 miles away. How interesting that the female *ansorgei* is so different on the E. side of the Rift Valley. I remember that the Lumbwa female resembled the male. The first specimen I ever saw was a female ovipositing at well over 7000 ft. It was laying on a shrub (or sapling tree) at the edge of forest, and by searching I collected quite a number of eggs, both then and on subsequent dates. The butterfly could scarcely be called common; in a period of three or four hours I doubt if I ever saw many more than a dozen. It seemed chiefly to frequent the edges of forest and to fly about in the usual dashing *Charaxes* fashion, though I am inclined to think it kept on the wing more continuously, and flew lower, than most of the genus. On thinking it over I have more than an idea that this applies to all the tawny species. The mainly black species either perched on leaves, etc., high up and escaped notice, or were hiding, for I seldom saw them flying until I put down bait, when they appeared from somewhere in great numbers, especially *etheocles*. This may be simply a personal fancy, but I am far from sure that it is." *Ch. a. ansorgei* enters Uganda, having been taken by Dr. S. A. Neave at Mt. Kokanjero, S. W. of Elgon and by Dr. G. D. Hale Carpenter at Bulago, N. Bugishu, on the W. slope of Elgon. Dr. Carpenter did not look upon it as a rare insect but a high flier and very hard to catch.

2. *The Race of C. ansorgei on the E. Escarpment of the Rift Valley.*—This race had been so fully described by Canon Rogers and Dr. van Someren that nothing further need be said except to quote F. Crawshay's notes (*Proc. Zool. Soc.*, 1900 : 915) on two females taken at Roromo, Kikuyu Forest. One of these, in the Tring Museum and labelled 22 January, 1900, was evidently referred to in the following words :—"Taken on the wing, when passing me, with a very lucky stroke of the net. As the specimen has the appearance of having lately emerged from its chrysalis, and was most carefully handled by me, I think the piece snipped from the right lower wing is probably the act of a bird." The other female, Butler's type, in the British Museum and dated 16 December, 1899, was captured "hovering over a bush in the most confiding manner and thus easily taken, doubtless in the act of depositing her ova, which on coming to disembowel her proved to be fully developed. Large rich yellow spherical ova, some twenty in number." It must be added that there is some inconsistency between these notes and the MS. on the labels, for the first, with the injury to the R.H.W., bears the words "taken when depositing ova," and the second the words "rich yellow ova."

In addition to these two races there are two and probably three others, in all of which the female bears a white F.W. bar.

3. *The Race near N. end of L. Tanganyika and in W. Uganda.*—*C. a. ruandana*, Talb.—Described from a single female taken Jan. 1924, by T. A. Barns in the Kabira Forest, 12 m. N. of Usumbura, 7000 ft., on the N. end of L. Tanganyika, Ruanda, E. Congo (1932, *Bull. Hill. Mus.*, 4: 289). Three males, in the Tring, Witley, and Fournier Collections respectively, taken near the N.W. shore of Lake Tanganyika and thus rather further S. than the female, are evidently of the same species, the range of which is carried much further N. by a single male (in the Hill Mus., Witley) taken by E. Barns on the Congo border of W. Uganda.

4. *The Lake Nyasa Race of C. ansorgei.*—The recognition of this very well-marked race I owe to the kind help of Mr. John Levick, F.E.S., who has allowed me to study a remarkable male from Lake Nyasa and a female, probably of the same subspecies from Manow to the N. of the lake. Both specimens were originally in the Charles Oberthür Coll.

5. *The S.E. Sudan Race of C. ansorgei.*—A single female taken 12 Apr. 1930, by Maj. F. Moysey at Katire, 3000 ft., between the Imatong Mtns. and the Acholi Hills, Mongalla Prov., S.E. Sudan, has been kindly lent to me by Col. R. H. Rattray. It is unfortunately in very poor condition, but the white markings of the F.W. are more strongly developed than in females of the second race so that it probably represents a different northern subspecies.

The first race, *C. a. ansorgei*, with male and female almost alike is evidently nearest to the ancestral form of the species. Both sexes, the influence of the male being stronger (because he is more commonly seen, the female because of her paler F.W. bar, have probably affected *Charaxes etheocles*, Cram., ♀ f. *van-somereni*, Poult., on the eastern border of its range, and have led by selective approach to a narrowing of the bar crossing both wings, thus promoting the evolution of the ♀ fs. *kirki*, Butl., and *albifascia*, Poult. The orange-brown anterior half of the H.W. bar in *kirki* probably arose much further east and beyond the range of the second race of *ansorgei*, under the influence of *saturnus*, Butl., and its mimics, the ♀ f. *rogersi*, Poult., being a stronger mimetic development in the same direction. The brownish tint of the H.W. bar was then probably transferred westward through the syngamic community to the area occupied by the second race of *ansorgei*, where it appears, although in a far smaller proportion of the females than that found in the more eastern *etheocles*.

While the female of *a. ansorgei* is, with its male, the model for certain ♀ fs. of *etheocles*, the female of the second race, is, as Dr. V. van Someren pointed out to me many years ago, a mimic of *Charaxes brutus*, Cram., the model of many white-barred species of the genus, as described in 1925 (1926) *Internat. Ent.-Kongr., Zürich*, 2: 536. The females of the third, *urundana*, and fourth races, together with the single female from the S.E. Sudan, also bear the *brutus*-like pattern. The female of the fourth race closely resembles that of the second, while the other two females of the third and fifth races diverge more strongly from the pattern of their males and carry even further the likeness to *brutus*.



It should be borne in mind that except as regards the first and second races the above conclusions have been based on very scanty material and may require modification. For the same reason no attempt has been made to suggest the mimetic associations of the males of the third and fourth races.

Figures of males and females of the first four races, together with brief descriptions when these are wanting, will, it is hoped, be communicated to *Stylops* in the near future.

The female of *Charaxes alticola*, Grünb., associated with the female of *C. ansorgei ruandana*, Talb., as a mimic of *C. brutus*, Cram., &c.

Mr. G. Talbot exhibited the female of *Charaxes alticola*, Grünb. (1912). This female, which he had described in 1927 (*Entomologist*, 60: 109), presents a remarkable likeness to the white-marked *ansorgei* females. The only two known females of *alticola* are from West Uganda, where also was caught a ♂ *ansorgei ruandana* (p. 8). *C. alticola* occurs also in the district of Lake Kivu, and was first taken at the Karissimbi Volcanos.

#### Two new genera of Coleoptera from the Himalayas.

Mr. H. E. ANDREWES exhibited specimens of two curious species of Coleoptera, that had been received with others for determination at the Natural History Museum. They were taken in 1931 by Dr. M. Cameron in the Himalayas and were believed to be CARABIDAE, but the first one, found at Gulmarg (8500 ft.) in Kashmir, proved on examination to belong to some other family, probably the SILPHIDAE or COLYDIDAE. The second, a true Carabid, found at Ghoom in Sikkim, resembles in appearance a large *Formicomus* (ANTHICIDAE), but has an immense square head and very small projecting eyes placed far forward. The exhibitor hoped before long to describe this remarkable insect.

---

Wednesday, March 2nd, 1932.

Dr. H. ELTRINGHAM, F.R.S., President, in the Chair.

#### Obituary.

The death of Dr. W. RANDALL PARKES, a Fellow of the Society, was announced.

#### Exhibits.

#### A nearly all-female brood of *Erannis (Hybernica) defoliaria*, Clerk.

MR. C. N. HAWKINS said: "On the 29th Nov., 1930, at Loughton, Essex, I took a pair of this species *in cop.*, the male being of the light and dark banded form and the female typical. Sixty-seven ova were laid in a chip box, and all hatched in due course, beginning on 21st Feb., 1931. The larvae were fed on *Crataegus oxyacantha*, and there were very few losses, 60 pupae being eventually obtained.

"Early in November 1931, one or two female imagines emerged but no males, and I then decided to turn out the pot of earth in which the larvae had buried themselves to find out what had happened to the male pupae. Five or six pupae

were malformed, but in no case was the deformity such as to prevent determination of the sex. An examination of the pupae showed that there were 58 females and only 2 males. Unfortunately both male pupae and the greater number of the females died, only about 20 apparently perfectly normal female imagines being ultimately produced, so that it was impossible to carry on the brood.

"Owing to the extremely small proportion of losses in breeding, prior to the pupal stage, there can be no doubt that this was a nearly all-female brood, and it therefore seems worth while to place the facts on record."

#### **Further evidence of attacks by birds upon British butterflies.**

Prof. POULTON said that he had received the following notes on this subject from his friend Mr. Champion B. Russell, B.A. :—

"1932, *Febr.* 1.—I have been told that you would be glad to record instances of birds catching butterflies on the wing. I have often seen Spotted Fly-catchers keeping up a stern chase after White Cabbage butterflies, and occasionally catching them—perhaps one kill to four pursuits; but I have a recollection of seeing a Fly-catcher once take a butterfly at the first shot. I have no doubt that the birds vary in individual skill, and in their desire for butterfly food. I remember one Fly-catcher at Upminster Hall many years ago that was very persevering; and seemed to go for every white butterfly that came along, but it was not particularly clever. I remember, too, years ago, noticing in the early morning in Hyde Park how much cleverer the London sparrow is at catching moths than his country cousin, who is generally very awkward at the job. When feeding my Martins with feathers—a lovely game, beautiful to watch—they fly at any feather which 'zig-zags' like a butterfly, but always fail to carry it off though they hit it sometimes. I expect it is partly due to the edge being presented rather vertically; the Martin's shots at such feathers are very bad in comparison with those at feathers floating in a horizontal position. This difficulty with the 'zig-zagging' feathers has suggested to me that one characteristic method of butterfly flight was evolved in order to elude capture by birds.

"I once saw a hen blackbird catch a white butterfly on the ground, and I once saw my chameleon (in a greenhouse) catch a Small White. He could not get the wings into his mouth, and so he crushed them, first on one side of his mouth and then on the other, against a flower-pot, and thus got them down all right."

The constant and persistent attempts to seize the feathers floating in the air were, he believed, well known as a manifestation of the instinct to collect material for lining the nest, an instinct which could be readily utilised for the capture of butterflies on the wing. Mr. Russell had kindly written explaining the method of testing the response.

"We generally fly the feathers—the 'zig-zagging' ones should be nearly round and rather short—from a loft which has a through draught, but it needs a windy day; to active youth the top of a high wall with open space to leeward is ideal. When we were children, Stubbers [North Ockenden, Essex] was the only place where sparrows allowed the Martins to nest, but now corn has given place to market-garden crops, they breed in every village and our 300 nests are reduced to about 30. In those days it was a glorious sight and we used to blow bubbles



for the Martins to break. I think they liked the shower-bath, as they always 'went for' the bubbles. There were even enough Martins to keep down the midges close round the house. Martins never seem satiated with feathers for their nest. They seldom take them from the ground; Swallows on the other hand generally alight to pick them up."

His friend Mr. B. M. Hobby had directed his attention to a paper on "Scientific work in local Societies" by Edward Meyrick, F.R.S. (1899, *Rep. Marlborough Coll. Nat. Hist. Soc.*, 47: 65-8). The author records the capture of *P. rapae* by a Spotted Fly-catcher which "ate the body and dropped all four wings." He accounts for the rarity of such attacks by the distastefulness of the butterfly and states that specimens of *rapae* were never eaten although repeatedly thrown to his fowls. Nevertheless in the single record, the Fly-catcher before seizing its prey "made eight or nine unsuccessful swoops at the butterfly, which dodged it skilfully every time." The special dangers which beset resting butterflies are also explained as well as the interest and importance of observations on the subject.

The following attack is also recorded:—"The last example of the clear-winged moth *Aegeria crabroniformis* taken here (the only one for many years) was caught by a tame Jackdaw."

#### Indirect evidence of attack by birds upon British butterflies.

Mr. J. F. PERKINS exhibited two butterflies which he had taken in 1931.

(1) A male *Erebia aethiops*, Esp. (*blandina*, F.), from Brodick, Arran, 7 August.



The L.F.W. showed the distinct imprint of a rather narrow beak, proving that the wing had been seized along the inner edge of the four eye-spots, as was clearly shown in the accompanying figure prepared from a photograph of the specimen by Mr. Alfred Robinson of the Oxford University Museum. (2) A male *Epinephele jurtina*, L. (*ianira*, L.), from Chudleigh, Devon, 1 July. The L.F.W. exhibited an indistinct beak-mark, passing close to the subapical eye-spot; the R.H.W. two beak-marks and the L.F.W. one.

The specimens may be studied in the Hope Dept. of the Oxford Museum.

#### The Brenthid Beetle *Amorphocephalus hospes*, Kolbe, found in an ants' nest in Nyasaland, by Dr. W. A. Lamborn.

Prof. POULTON exhibited the material referred to in the following note written by his friend Dr. Lamborn:—"1192. Series of ants with inquiline beetle from nest made in cavity bored in leaf-stem of 'Naiwale' palm by *Rhynchophorus phoenicis*, F., or allied species. Maiwale, 2.xii.1931."

Kind help in determining the species had been received from the following friends:—

The ants, winged males and workers of two sizes, had been determined by Mr. H. St. J. K. Donisthorpe, as a species (not in the British Museum) of the *foraminosus* group of *Camponotus* (*Myrmotrema*).

Sir Guy Marshall had named the Brenthid beetle, *Amorphocephalus hospes*, and kindly directed his attention to Wasmann's *Kritisches verzeichn. d. Myrmekophilen u. Termitophilen Arthropoden*, Berlin, 1894. The author on p. 158 recorded the presence of BRENTHIDAE in the nests of two species of *Camponotus*. R. Kleine in 1916, *Arch. f. Naturges.*, **82**, (A) 12, Nov. 1918, while appearing on p. 74 to criticise Wasmann, brings forward confirmatory evidence.

Dr. A. D. Cotton had kindly obtained the opinion of Mr. J. H. Holland of the Kew Museum of Economic Botany, that the "Naiwale Palm" was probably *Hyphaene crinita*, Gaertner (Palmaceae). The name "Newalanewa" was given for this palm in the Chief Officer's Annual Report, 1926, No. 12.

#### Reduviid bugs (APIOMERINAE) capturing their insect prey by means of adhesive resin-covered fore-legs.

Prof. POULTON said that he had received the following interesting note by his friend Mr. W. E. China, referring to a communication on 3 June, 1931, on a frog-like Reduviid from Borneo. The method of capturing prey was of great interest and adds another to Dr. J. Bequaert's list of the dangers encountered by ants (1922, *Bull. Amer. Mus. Nat. Hist.*, **45**: 271-331).

"25 Jan. 1932.—With regard to my note in connection with the frog-like Reduviid Bug from Borneo, in *Proc. Ent. Soc. Lond.*, **6**: 57-58, Dec. 1931, I have now come across my notes on the behaviour of species of this genus. The Dutch entomologist mentioned was Dr. W. Roepke, who visited the Museum in 1930. His statement was to the effect that a certain species of *Amulius* living on the bark of old trees of *Pinus merkusii*, Junghuhn & de Vriese, in N. Sumatra, covered the fore-tibiae and reduced tarsi with fresh resin and with these 'lime sticks' the insects captured their prey, chiefly consisting of ants (*Dolichoderus* spp.).

"As long ago as 1902 Dr. Uyttenboogaart (*Tijds. v. Ent.*, **45**: 36-37) showed that the S. American species *Beharus lunatus*, L. & S., belonging to the same Reduviid subfamily APIOMERINAE, behaved in a similar way. Unfortunately this paper is in Dutch, which is unfamiliar to me. As regards the feeding behaviour of other members of the subfamily, very little is known. According to Mrs. H. H. Brindley (M. D. Haviland), 1931, *Zoologica, N. York*, **7**: 145, the South American *Apiomerus hirtipes*, Champ., feeds on Termites. In this species although the fore-legs are structurally similar to those of *Beharus* and *Amulius*, they are apparently not used in the same way and the hairs are not matted with resin in the Museum specimens."

#### Changes in the method of insect protection at successive periods of growth.

Prof. POULTON said that he had recently read Major R. W. G. Hingston's interesting paper (1929, *J. Bombay Nat. Hist. Soc.*, **23**: 341) in which the various changes in the life-history of the Indian Coreid bug, *Anoplocnemis phasiana*, F., were described and figured. Changes of this kind—procryptic, aposematic or



mimetic—were of course evident in the successive stages of insect metamorphosis, but the great interest of Major Hingston's observations lay in the fact that they were concerned with a Heterometabolous insect which, after hatching from the egg, underwent no abrupt transformational change.

The eggs, deposited in a single line on a twig, are, in colouring, form and arrangement, procryptic.

(1) After hatching and before the first change of skin the insect is "a spider-like object, absolutely black except for a stripe transversely across the middle of its back." The aposematic effect is increased by a gregarious habit. When alarmed the abdomen is raised.

(2) After the first change of skin the anterior tibiae are flattened and the jet-black insects tend to wander away in twos and threes.

(3) The next stage, about  $\frac{1}{4}$  in. long and now entirely unsocial, "is absolutely black save for bands on the antennae and a pale line across the middle of its waist." The abdomen is held upright and the flattened plates on the fore tibiae "are thrust out conspicuously in front." A slightly unpleasant odour is emitted. The author considers that the raised abdomen deceptively mimics such an insect as a *Cremastogaster* ant. The flattened tibiae held out in front he regards as mimetic of a raptorial insect. It must be remembered, however, that the dilatations are reduced in Stage 4 and have almost disappeared in 5, while their greatest development in so small an insect as that of Stage 3 would not strongly suggest a model of this kind. The appearance in figs. 2 and 3 of Maj. Hingston's Pl. I may indicate a tibial glandular structure or possibly a sense-organ. The author also observed that the insect, sucking the sap of the young shoots of the Bael tree, kills the attached leaves which "then droop in a shrivelled cluster and end by becoming absolutely black." Under this canopy the bug rests and feeds, protected both by colour and form, the procryptic likeness enhanced by the tibial dilatations which resemble the smallest of the blackened leaves.

(4) The third moult takes place under the darkened leaves. The bug at this stage is larger, more sluggish and no longer erects its abdomen. Two small pores, now clearly visible on the dorsal surface of the abdomen, emit an evil-smelling fluid. It would be interesting to observe whether the slightly unpleasant odour of the preceding stage is emitted from the corresponding pores which were present although very inconspicuous.

(5) and (6) The tibial dilatations have almost disappeared in the 5th and entirely so in the 6th stage. The bug no longer hides but is protected by an aposematic appearance, the discharge from the pores, and by readily falling to the ground. The wings appear in the 5th and increase in size in the 6th stage.

(7) In the mature insect the warning pattern is still more conspicuous and its effect greatly increased by the position assumed, head downwards and motionless, at the extreme tip of a shoot. The principal defence is the offensive fluid, no longer emitted by dorsal abdominal pores which would be covered by the wings, but discharged to a distance of about a foot from the upturned end of the anal extremity. When disturbed and about to take flight the raised wings suddenly reveal the aposematic red colouring of the dorsal abdominal surface. As a last resort the bug falls to the ground and seeks refuge in the grass or herbage.

Major Hingston was to be congratulated on his careful observation and record of these varied and, in some instances, contrasted methods of protection in the life-history of a single species.

Dr. N. C. JOY exhibited an unusual *Carabus* from the top of Mt. Snowdon.

### The Prey of Sawflies (Hym., TENTHREDINIDAE).

Mr. B. M. HOBBY said that although the imagines of many species of TENTHREDINIDAE took no food, others fed on the pollen and nectar of flowers, while some, especially those of the genera *Tenthredella*, *Tenthredo*, *Macrophya*, *Tenthredopsis*, *Rhogogaster* and *Taxonus*, were predacious (Enslin, 1912, *Deuts. Ent. Z.*, Beiheft, "Die Tenthredinoidea Mitteleuropas," pp. 24-5). Cameron (1882, *A Monograph of the British Phytophagous Hymenoptera*, p. 22) states that many species frequent flowers, partly for the purpose of feeding on pollen, but also in order to prey upon other insects found in such situations.

Although the carnivorous habits of sawflies had long been recognised, scarcely any definite records were available. The short list of prey given below had been compiled from material in the bionomic collections of the Hope Department, University Museum, Oxford, but also included a few records kindly supplied by Messrs. R. B. Benson and J. W. Saunt, together with a few previously published observations. Much kind help in identification had been given by Dr. F. W. Edwards, Commander J. J. Walker, Messrs. R. B. Benson, J. E. Collin and C. J. Wainwright.

With but few exceptions, all the sawfly captors were females (cf. preponderance of female captors noted in the ASILIDAE, COENOSIINAE, CANTHARIDAE and some CORDYLURIDAE). The prey (17 Diptera, 4 Hymenoptera, 2 Coleoptera and 1 Lepidopterous larva) was on the whole of small or medium size, but a few larger insects were represented (e.g. *Empis tessellata*). Nearly all were species that might be expected to occur on flowers. All the Hymenopterous prey were sawflies, but in no instance quoted above was the captor found devouring its own species (cf. Enslin, *loc. cit.*, p. 25, who states that occasionally female TENTHREDINIDAE devour the smaller males).

1. \**Rhogogaster punctulata*, Klug., ♀, with Tenthredinid *Pteronidea* sp.? *myosotidis*, F., ♂, Shotover Hill, Oxford, 1.vii.17.—A. H. Hamm.

2. ? *R. viridis*, L., with Syrphid, *Tropidia scita*, Harr., Wicken Fen, Cambs., 11.vi.26.—A. P. G. Michelmores. (*The Natural History of Wicken Fen*, (Diptera) (5): 477.)

3. \**Tenthredo arcuata*, Forst., ♀ [*Allantus* ? *arcuatus*, Scop.], with Stratiomyid *Chloromyia formosa*, Scop., ♀, Twitchen, Morte-hoe, Devon, 20.vii.09.—G. B. Longstaff. (1910, *Ent. Mon. Mag.*, 46: 75.)

4. *T. arcuata*, with Syrphid *Chilosia albitalarsis*, Mg.—King teste R. B. Benson.

5. *T. arcuata*, ♀, with Empid *Empis pennipes*, L., ♀, Ban-chory, Kincardine.—Elliott. (1913, *Entomologist*, 46: 48.)

6. \**T. arcuata*, ♀, with Empid *Rhamphomyia* sp., Bonhill, Dumbarton, 4.viii.07.—J. R. Malloch.

\* Specimens in Hope Department, University Museum, Oxford.



7. \**T. arcuata*, ♀, with Acalypterate Dipteron, near Sandwich, Kent, 18-21.vii.05.—H. Donisthorpe.
8. \**T. perkinsi*, Morice, ♀, with Bibionid *Dilophus febrilis*, L., ♂, Kimbers Wood, Oxford, 29.viii.09.—A. H. Hamm.
9. \**Tenthredella albicornis*, F., ♀, with Tipulid *Pachyrrhina* sp.? *histrio*, F., ♂, near Murren, Switzerland, 14.vii.98.—E. B. Poulton.
10. \**T. atra*, L., ♀, with Nitidulid *Meligethes* sp. indet., Ferry Hinksey, near Oxford, Berks., 6.v.31.—B. M. Hobby.
11. \**T. atra*, ♀, with Cantharid *Rhagonycha fulva*, Scop., ♀, Woodgreen, near Fordingbridge, Hampshire, 3.viii.27.—B. M. Hobby. (On Umbelliferous flower-head.)
12. \**T. atra*, ♀, with Bibionid *Dilophus febrilis*, L., ♂, Lye Hill, Oxford, 22.v.10.—A. H. Hamm.
13. \**T. atra*, ♀, with *D. femoratus*, Mg., ♀, Lye Hill, Oxford, 31.v.31.—B. M. Hobby. (On Umbelliferous flower-head.)
14. \**T. colon*, Kl., ♀, with Tenthredinid ? *Monophadnus* sp., ♀, Stretton under Fesse, Warwicks., 2.vi.31.—J. W. Saunt.
15. \**T. livida*, L., ♀, with Tenthredinid *Strongylogaster cingulatus*, F., ♀, Porthcawl, Glamorgan, 9.vi.06.—J. W. Yerbury.
16. \**T. livida*, ♀, with Tenthredinid *Athalia* sp.? *lineolata*, Lep., ♀, Twitchen, Morteheo, Devon, 26.vii.09.—G. G. Longstaff.
17. \**T. [Tenthredo] mesomelas*, L., frequently found preying on the Bibionid *Bibio marci*, L., Coventry district, Warwicks.—J. W. Saunt. (1927, *Entomologist*, 60 : 284.)
18. \**T. mesomelas*, ♀, with Tachinid *Calliphora erythrocephala*, Mg., ♂, Timworth, Suffolk, 5.v.11.—C. G. Nurse.
19. *T. [Tenthredo] mesomelas*, ♀, with Cordylurid *Scatophaga stercoraria*, L., ♂, Sandiacre, Derbyshire, 22.vi.12.—J. W. Saunt. (1927, *Entomologist*, 60 : 284.)
20. \**T. temula*, Scop., ♀, with Empid *Empis tessellata*, F., ♂, Malvern Hills, Hertfordshire, 8.vi.02.—J. W. Yerbury.
21. \**T. temula*, ♂, with *E. tessellata*, sex indet., Charing, Kent, 11.vi.04.—H. Donisthorpe.
22. \**T. temula*, ♂, with Anthomyid *Fannia* sp.? *mutica*, Zett., ♂, Shotover, Oxford, 12.vi.10.—A. H. Hamm.
23. \**Tenthredo rossii*, Panz., ♀, with Tachinid sp. indet., ♂, Glion, Switzerland, 2-5.vii.08.—T. A. Chapman.
24. Green Sawfly [? *Rhogogaster viridis*, L., or *Tenthredella mesomelas*, L.—cf. 1927, *Entomologist*, 60 : 235] with green Lepidopterous larva probably the Geometrid *Operophtera [C.] brumata*, L., Dovedale, Wores., 4.vi.27.—H. W. Daltry. (1927, *Entomologist*, 60 : 235.)

**On the predacious habit in *Tenthredo marginella*, F., and on possible mimetic associations in Sawflies.**

Mr. HOBBY also read the following communication from Mr. Robert B. Benson :  
 " On August 15th, 1928, I was making observations on the habits of the large

\* Specimens in Hope Department, University Museum, Oxford.

wasp-like sawfly *Tenthredo marginella*, F., which was swarming on the flowers of Wild Parsnip (*Pastinaca sativa*, L.) at Dancer's End, Tring, Herts. They spent most of their time devouring pollen, but now and again made darts at other insects. I observed a male devouring a Braconid. Other examples were seen devouring small Beetles. One made a dart at another sawfly, *Athalia lineolata*, Lep., and seizing it, held it for a moment and then quietly let go and left it. The *Athalia lineolata* kept calm and unperturbed and continued devouring pollen, making no attempt to escape. Unfortunately no note was made of the sex of the *Tenthredo*.

"The action on the part of the *Tenthredo* may have been sexual, if it were a male, or it may have been to obtain food, more particularly if it were a female.

"The characteristic colour pattern of the *Athalia* is very widespread in the Sawflies as in many other groups of insects. The yellow abdomen and black thorax turns up again and again in such diverse families as the PERREYIIDAE, many genera of the ARGIDAE and almost every subfamily of the TENTHREDINIDAE. One would imagine that the widespread occurrence of this particular colour pattern must have some underlying explanation. It may be some primitive character or possibly a mimetic association.

"This yellow-black pattern is not to be confused with the wasp association to which the predator in this case and most species of the genus *Tenthredo* belong."

#### Calliper-like appendages in some American Moths.

Dr. KARL JORDAN exhibited some American moths remarkable for a pair of appendages at the end of the abdomen and said that in the Zygaenid, *Stylura forficula*, H.-S., from Colombia, the Amazon and other districts of S. America, the last external segment (the seventh in both sexes) was drawn out at each side of the apex into a long projection clothed with rough scaling, the process being longer in the ♂ than in the ♀. A small number of American Zygaenids had such appendages at least indicated. In the Syntomid, *Proctocopsis forficula*, Draudt, from Colombia and Peru, the claspers of the male, *i.e.* the lateral sclerites of the ninth segment, were long, curved and projected much beyond the end of the abdomen. In another Syntomid, *Didasys belae*, Grote, from Florida, the claspers were exposed and curved in a similar way and each was provided with a tuft of long hair pointing backwards. The male claspers of the third Syntomid exhibited, *Cyanopepla buckleyi*, Druce, from Ecuador and Bolivia, were normally not exposed, but could be projected as in the specimen shown, possibly when the moth was frightened. In all cases there was a resemblance to the callipers of an earwig, as indicated by the specific names of two of the species.

#### Resemblance between Arctiids and Syntomids.

Dr. JORDAN further exhibited some American Arctiids and Syntomids (1) to illustrate great resemblance in outward appearance, and (2) to draw attention to the significance of vein 8 in the hind-wing of certain Syntomids. The parallelism in the development of colour and pattern was frequently very striking in members of the two families, as for instance in *Beleliastes eucyane*, Feld., and *Napata eucyane*, Feld., and in *Xanthopleura perspicua*, Walk., and *Chlorostola* sp. The two families were separated in Hampson's classification on account of vein 8 of the hind-wing being absent in the SYNTOMIDAE and well developed in the ARCTIIDAE,



but there were many species in the Syntomids, as stated by Hampson himself, in which vein 8 was present though shortened. In the *Xanthopleura* exhibited, the vein was as fully developed as in many species placed by Hampson in the Arctiids. This classification had no sound basis and needed to be re-cast. The species of Syntomids, as the family stood at present, might be arranged in three categories according to the degree of reduction of vein 8: (1) Species without a trace of 8; (2) with 8 more or less distinct in some specimens and absent from others; and (3) with a reduced vein 8 present in all specimens. Among the species of group (2), there were some in which vein 8 was sex-linked, which seemed to have been overlooked. As an example, a sketch of the hind-wing neuration of both sexes of *Aclytia terra*, Schaus, from S.E. Brazil, was shown (text-fig. 1). In this and some other species, 8 was present only in the male. Vein 8 being an ancestral character,

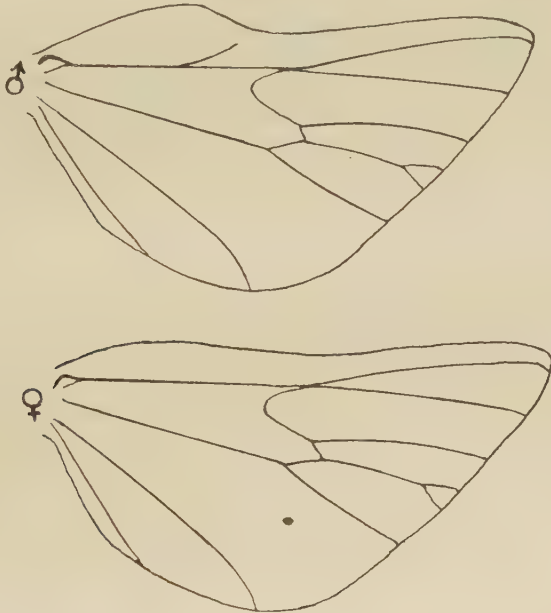


FIG. 1.—*Aclytia terra*, Schaus (1896).

the female of *A. terra* was more advanced than the male. Some biologists might be inclined to dismiss the case by attributing the absence of 8 in the female to proterogyny. But the giving of a Greek name to a phenomenon was not an explanation. Moreover, was vein 8 really lost in the female (and in the majority of Syntomids)? Was it not more correct to say that it was suppressed in the winged stage, but carried along from generation to generation in the earlier stages inclusive of the germ cells? The opinion that a lost organ could not be recovered was quite correct if the word *lost* was used in the restricted sense of "not recoverable"; but if anything not visible was considered as *lost*, the "law" was erroneous. There was no evidence whatever that vein 8 was not represented in the larval or pupal stages of the Syntomids. The presence of a lobe on the costal margin of the male of *Aclytia terra* (fig. 1) in connection with a scent-organ was very significant, as it was quite feasible that the acquisition of a scent-organ supplied the

stimulus for the reappearance of the suppressed vein 8, as a support. The examination of the tracheae and venation of the larval and pupal wings of some Syntomids would throw more light on the question.

### The function of the so-called rectal glands of insects.

Dr. V. B. WIGGLESWORTH said that there was at the present time no satisfactory knowledge of the function of the rectal glands of insects, which had been regarded in turn as producing some secretion of unknown nature and function, or as being in some fashion respiratory, or as serving merely to close the hinder end of the intestine. He described observations on larval and adult insects belonging to all the main orders, which led him to suggest that the rectal glands and rectal epithelium re-absorb water from the excrement before it is discharged, and thus play an important part in water-conservation. He recalled that at a recent meeting of the Society, Mr. K. Mellanby had shown that insects varied greatly in their ability to survive in dry air at high temperatures. It was notable that those insects which Mr. Mellanby had found to be most resistant to drying were those which were most efficient in preventing loss of water in the excreta.

A full account of these observations on the rectal glands is published in 1932, *Quart. J. Micr. Sci.*, **75**: 131-150.

### Papers.

The following papers were read :—

- (1) "The plume-scales of the Pierinae," by F. A. DIXEY, F.R.S.
- (2) "Biological observations on some Neotropical parasitic Hymenoptera," by J. G. MYERS.
- (3) "Entomological Expedition to Abyssinia. Microlepidoptera," by E. MEYRICK, F.R.S.

Wednesday, March 16th, 1932.

Dr. H. ELTRINGHAM, F.R.S., President, in the Chair.

### Obituary.

The deaths of Mr. DOUGLAS JOHNSTONE, Mr. J. J. JOICEY, and Mr. A. M. LEA, Fellows of the Society, were announced.

### Election of Fellows.

The following were elected Fellows of the Society: T. H. E. JACKSON, Kapretwa, Kitale, Kenya Colony; Dr. R. JEANNEL, Muséum National d'Histoire Naturelle Paris.

### Exhibits.

### *Eurytela dryope* attacked by a bird in Africa.

Dr. G. D. HALE CARPENTER exhibited the wings of a specimen of the common Nymphaline butterfly, *Eurytela dryope*, Cr., which showed evidence of attack by a bird. A wagtail, *Motacilla vidua*, had been seen running about on the shore of the



island of Wema, L. Victoria, and at that spot the two fore-wings and left hind-wing of the butterfly were found lying. At the base of the left fore-wing there was the clear imprint of the beak of a bird, a long narrow triangle whose apex reached the costa, the direction of the mark being from behind, forwards and slightly towards the middle line. There was a tear on the outer margin of the left fore-wing, and the anterior angle of the left hind-wing had been torn away. The right hind-wing was not found. The presumption is warranted that the body of the butterfly had been eaten by the bird whose beak had made the imprint on the wing which, from its shape, might well have been made by a wagtail. The wings were found on 31st January, 1919.

**A Note on three specimens of *Heodes phlaeas*, L., from the Imatong Mountains, S.E. Sudan.**

[Prof. POULTON, in the unavoidable absence of his friend, Mr. E. B. Ford, M.A., B.Sc., communicated his remarks and exhibited the three specimens which had been kindly lent by Col. R. H. Rattray.]

On April 22-3, 1928, Maj. F. Moysey, F.E.S., captured two specimens of *Heodes phlaeas*, L., on the Imatong Mountains, near the boundary between the south-eastern Sudan and Uganda (approximately 33° E. 4° S.). The species has not previously been recorded from this locality, and he obtained a third specimen at Ras Logoforok, 8000 ft., in the same range, on July 20th, 1930. All three are nearly identical in appearance. The one captured in July is slightly larger than the others, but is quite similar to them in colour and marking. A single description will therefore apply to them all.

The insects resemble European *phlaeas* in size, varying from 28 to 34 mm. in total expanse. They are therefore smaller than most Oriental forms. On the upper surface the fore-wings are a clear bright copper, destitute of any black or brown suffusion, and the "critical spot" is turned inwards in all three. The copper band on the hind-wings is broad and tends to run for a short distance up each nervure. The remainder of the hind-wings is black, with a distinct dusting of copper scales up to the base. There are no blue spots.

The under surface of the hind-wings is brick-red of a somewhat dark tone due to a considerable scattering of black scales over its surface. The dark spots, lunules, and border show up with unusual clearness. The red line, which is present within the outer margin of European specimens, has become a band, as in other Ethiopian and, especially, Oriental forms. It is here broad and pale in colour.

Three forms of *Heodes phlaeas* are known from the Ethiopian Region. These are (1) *ethiopica*, Poulton, from high ground (about 6000 ft.) in south-western Uganda, and further to the south on high land near Lake Kivu; (2) *pseudophlaeas*, Lucas, from high ground (5000 to 8000 ft.) in western Abyssinia; (3) *abbotti*, Holland, from 6000 ft. upwards on Kilimanjaro, in Kenya Colony and Tanganyika. All of them have certain characteristics in common, but they form a series, in the order named, in progressive departure from the European type. Full descriptions of them already exist; it will suffice, therefore, to mention their chief characteristics and those which bring out this point.

All three forms lack any trace of suffusion on the copper of the fore-wings. The underside of the hind-wings is of a most curious warm brown, or brick-dust shade. This is quite distinct and serves to separate Ethiopian *phlaeas* from all others at a glance. On the upperside, the hind-wings of *ethiopica* are black (with, of course, the copper sub-marginal band). In *pseudophlaeas* they are black with a copper dusting, and in *abbotti* they are bright copper up to the base. On the underside, the ground-colour of the hind-wings of *ethiopica* is a brick-dust shade but quite dark, owing to a considerable scattering of black scales, and the red band is distinct. In *abbotti* the ground-colour is of a very light brick-dust shade and the red band is much obscured. *Pseudophlaeas* is intermediate between these two forms in both these characters.

It will be seen that the three specimens now under consideration, which come from a more northerly station than the others—indeed from the very boundary of the Ethiopian Region—resemble *pseudophlaeas* in the copper dusting on the upper surface of the hind-wings and *ethiopica* in the dark colour of their under surface. The distinctness of the spots upon it separates them from either.

**The courtship of a male *Danaida chrysippus*, L., by a male *Hypolimnais misippus*, L., which evidently mistook the model for its own mimetic female.**

Prof. POULTON exhibited a male *chrysippus* kindly sent to him, 2 February 1932, by his friend Prof. T. Bainbrigg Fletcher. The following note accompanied the specimen :—

“*Danaïs (Limnas) chrysippus* pursued persistently by *Hypolimnais misippus*, ♂, not attacking but courting; Coimbatore; 24 Jan. 1913. This specimen was put away in an open envelope in a cardboard box which was by no means proof against mites and *Lepisma*. That it has not been eaten, after lying about for nineteen years, says something for its unpalatability.”

The condition of the specimen provided a striking confirmation of the observations recorded and referred to in 1930, *Proc. Ent. Soc. Lond.*, 5 : 41—all the more striking because the liability to attack by pests would have been so great in the tropics. The fact that a male was being courted was a proof that colour and pattern and no other qualities were the stimulus which acted on the pursuing *Hypolimnais*. The sexes of *chrysippus* being alike and equally providing a model for the female *misippus* it was evident that they would equally attract the male of the latter so far as its epigamic behaviour is determined by the sense of sight.

**Red stain on *Parnassius apollo* believed to have been caused by Liliaceous pollen.**

Prof. POULTON said that his friend Mr. J. A. Simes had kindly sent him the following note abstracted from 1919, *Entomologist*, 52 : 20 :—

“Mr. Charles E. Morris spent the summer of 1918 collecting in the Alpes Maritimes, France. He says that all June and early July the *Parnassius apollo* of both sexes were so stained with rust-red as to be useless. M. Lameere, the Belgian Professor of Zoology, told him that the stains came from the pollen of Liliaceous plants, i.e. *Lilium croceum*, and *L. martagon*.”

This observation supported Prof. A. G. Tansley's suggestion that the pollen on the wings of African *Papilio*s exhibited to the Society was Liliaceous or Amaryllid-



aceous (1929, *Proc. Ent. Soc. Lond.*, 4 : 108-9). See also *ibid.*, 1918 : lxxxiv, and Maj. R. W. G. Hingston's notes in 1930, *ibid.*, 5 : 114.

#### **Hawk-moth alighting on and rising from the surface of a pool.**

Mr. Simes had also kindly sent him the following abstract from 1919, *Entomologist*, 52 : 91-2, bearing upon the observations recorded in *Proc. Ent. Soc. Lond.*, 1909 : xxxviii, and 1928, *ibid.*, 3 : 64-5, and especially upon Mr. C. L. Collenette's observation (on p. 65) of a hawk-moth rising from the sea in the Gulf of Panama.

"On June 30th, 1918, Major F. B. Scott, Indian Army, saw a Hawk-moth, believed to be *Deilephila euphorbiae*, alight on the surface of a pool at Quetta, Baluchistan. When first seen the wings were held, vibrating, above the surface; but presently the moth rose and flew away—to return later and settle again on the surface of the pool. On this occasion it allowed the wings to 'lie flat on the surface.' An attempt being made to catch it, the moth rose without difficulty and flew away."

#### **A Hawk-moth flying round the lights of a steamer in the S. Atlantic, over 300 miles from Brazilian Coast.**

Mr. J. A. SIMES exhibited a female *Pholus anchemolus*, Cram. (MACROGLOSSINAE), taken in 1920 on a steamer of the Houston Line, in the circumstances explained in the above title. The specimen would be added to the series illustrating the dispersal and migration of insects, in the Hope Collection, Oxford University Museum.

#### **The attacks of birds on insects recorded about a century and a quarter ago.**

Prof. POULTON said that the Registrar had kindly shown him the following entries in a volume of manuscript notes, probably by John Hatchett. The earliest date was "Dec. 1802," referring to "Proposals for the Meetings of the Aurelian Society."

The following notes, unfortunately without the year, but certainly early in the history of the Society, were quoted below :—

"(Female Emperor?) Bred in my garden and killed by a Bird. Wings picked up by my Daughter Frances July 24th. No. 2.

(Empr. Wing.) Found under a Raspberry bush, with other fragments July 17th. No. 3.

(Empr. Moth.) Picked up dead on a border killed by a bird. Apr. or May.

(*Lucanus inermis*.) Picked up in garden with many more, some of them imperfect : viz. mutilated by birds."

#### **A Note on *Glyphotaelius pellucidus*, Retz.**

Mr. H. ST. J. K. DONISTHORPE, on behalf of Mr. M. E. Mosely, said :—

The larva of this Trichopteron inhabits still waters and makes its case out of vegetable matter, cutting circular discs out of leaves with which to form an outer covering. The inner case is constructed of small fragments.

The case exhibited was made in the museum, and the residue of the leaf shows the symmetrical working of this caddis grub.

The adult included was merely an example of the species and not the actual insect that emerged from the case.

Wednesday, April 6th, 1932.

Mr. R. W. LLOYD, Vice-President, in the Chair.

*Election of Fellows.*

The following were elected Fellows of the Society : ARTHUR EGBERT ANDREWS, Indian Tea Association, Tocklai Experimental Station, Cinnamara, Assam ; CHARLES BARTLETT, Morwenstow, 8, Woodhill, Portishead, near Bristol ; THOMAS LESLIE GREEN, 4, Albert Bridge Road, S.W. 11 ; J. E. PINDER, Melissa, Belle Vue Road, Salisbury.

*Obituary.*

The deaths of Mr. C. MATTHEWS, Mr. R. STANWAY PARRIS, Mr. M. G. L. PERKINS, and Mr. R. SOUTH, Fellows of the Society, were announced.

*Exhibits.*

**The Attacks of Birds on Insects.**

Mr. E. B. ASHBY said with regard to the attacks of birds on insects he wished to call attention to a record that he had published some years ago of a case of a bird, believed to be a shrike, attacking and carrying off an example of the common stag-beetle, *Lucanus cervus*. The incident happened in Northern Italy in 1918.

**A *Sphodromantis* with a convolvulus Hawk-moth as prey.**

Dr. E. A. COCKAYNE read the following communication, on behalf of Mr. T. A. M. Nash, from Kikori, Kondoa Irangi, Tanganyika Territory :—

“On the evening of February 18th I was watching a praying mantis on a tobacco plant. A convolvulus hawk-moth hovered in front of the insect and probed a flower. The next thing I saw was that the moth had been pinioned by each shoulder and was making frantic but ineffectual struggles to escape by vibrating its small and useless hind-wings. The mantis plunged its mandibles into the thorax of its prey and began tearing at its flesh. Three minutes later the moth was dead, the mantis continuing to feed voraciously. By the time it had reached one eye, I chloroformed the insect *in situ*. Had the mantis caught the moth in any other way, it would have been beaten off by the powerful blows of the fore-wings. As it was, the sharp spines between tibia and tarsus held the fore-wings in a vice-like grip and the moth was completely powerless from first to last. The mantis, green in colour to match the plant and about 4.3 cm. long, has been identified by Mr. Uvarov as a species of *Sphodromantis* in the last stage but one.”

**Resemblance of moths to bird-droppings.**

Dr. G. D. HALE CARPENTER exhibited a specimen of the Geometrid, *Problepsis egretta*, Feld., taken by him in November, 1912, on the north-eastern portion of Bugalla Island, L. Victoria, and also specimens of the English Notodontid *Cilix glaucata*, Scop., for comparison. He remarked that *Problepsis* was the most perfect example of resemblance to a bird-dropping dispersed over a flat surface that he had ever seen. The moth rests with its wings widely spread ; they are chalky white with



white fringes, and three wavy lines giving a "watered" appearance roughly parallel with the outer margins.

In the centre of the fore-wing is an irregular dull yellowish mark, narrowly bordered with black and silver, and just behind this mark a faint tint of yellow on the posterior border of the wing. This leads the eye backward to a mark in the centre of the hind-wing composed of a faintly yellow patch of oblong shape bordered on the outer and inner sides by a silver line; and along the middle third of the anal border of the wing, opposite to the previously mentioned mark, is a brilliantly silver patch.

It is obvious even to the naked eye that the border to the yellow marks on the wings is raised above the general level. Under a low power objective of the microscope it is seen that the silver border of the marks is composed of scales much larger than those of the general wing surface, appearing brilliantly iridescent, and whereas the others have dentate ends, these are straight-edged. Since these larger scales appear flat, the reason for their being above the general level of the wing may be that they have longer stalks, but at an angle. But this could only be determined by removing some, which Dr. Carpenter was loth to do.

At intervals along the silver border on the fore-wing, at angular points, there are patches of intensely black scales, of the same nature as the usual type on the wing. The silver scales along the anal margin are of the same shape and iridescence as the others, and are extremely beautiful objects.

*Cilix glaucata*, by comparison, is interesting. The general colour is a greyer, not so chalky, white. The darker grey patch on the fore-wing is larger, and without the yellow of *Problepsis*, but in the centre of the anterior portion of the mark there is an irregular linear marking of silver, slightly raised. Under the microscope these are, as in *Problepsis*, seen to be different from the general type, being broader (though not to such a degree as in *Problepsis*) and not dentate. They are not so highly iridescent as in *Problepsis* and therefore, to the naked eye, not so conspicuous a feature of the mark.

Dr. Carpenter remarked upon the interesting fact that the closeness of the resemblance to a bird-dropping was greatly accentuated by a development of special scales in moths of two such different groups as GEOMETRIDAE and NOTODONTIDAE. The production of raised patches to accentuate special procryptic resemblance finds a parallel in the markings on the under surface of the famous leaf-butterfly, *Kallima*, on which patches of scales beautifully represent little areas of fungus growth. Resemblance to a bird-dropping, although an example of special procrypsis, is strictly analogous to true mimicry, or pseudaposematic resemblance. There is detailed resemblance to an object easily recognised as of no food value or actually distasteful or obnoxious. Probably few would deny that the appearance of *Problepsis* or *Cilix* is the result of natural selection, yet it is sometimes claimed that true mimicry cannot be due to this cause.

It was further pointed out that cylindrical insects such as beetles or caterpillars also resemble bird-droppings, for instance, young larvae of certain common African species of *Papilio*. In this case the object resembled is one that has maintained its cylindrical form and is usually of darker colour. Lepidoptera usually resemble the total picture made up by a central solid residuum and a surrounding film of salts resulting from evaporation of fluid.

But certain smaller moths which fold their wings around the body are able to resemble a cylindrical bird-dropping.

### Recent Insect Immigrants.

Mr. HUGH MAIN exhibited several living insects which had arrived as stowaways among imported goods.

A large cockroach, a species of *Blabera*, was found in a bag of raw sugar from Cuba on Feb. 4, 1932. When stimulated by stroking its elytra, it would sometimes be heard to stridulate, making a distinct short hissing sound. It was difficult to gather how this was produced, but apparently it arose when the abdominal segments were simultaneously contracted towards the thorax. It is stated in the Cambridge Natural History\* that species of *Blabera* are known in the West Indies as drummers, it being supposed that they make a noise at night, but details in confirmation are said to be wanting. According to Mr. K. G. Blair, the insect is not in the British Museum, nor is a large bug which he has identified as *Edessa* sp. which was found among bananas from Brazil. From the same source were two common beetles *Erotylus histrio*, F., and the Passalid *Neleus tlascala*, Percheron.

Perhaps the most unusual insect received was a large larva of a Pyrophorid beetle, which arrived in a bag of Cuban raw sugar on Aug. 5, 1930. It had continued to feed readily on larvae of *Rhagium inquisitor*, L. It had moulted three times and appeared to be getting ready for another moult, perhaps this time to the pupal state. It is easily comprehended how a cockroach could gain entrance into a bag of sugar, but not how a larva which probably lives in a tree stump could reach similar quarters.

Other animals recently obtained included spiders such as *Avicularia* and *Ctenus* spp., Millepedes, Geckos and a Skink.

### *Chrysophanus dispar batavus* ♀♀ bred from the Wood Walton Fen Colony in 1931.

Mr. H. M. EDELSTEN exhibited specimens of *Chrysophanus dispar batavus* ♀♀ bred from the Wood Walton Fen Colony in 1931. The outer row of spots on the fore-wings showed a tendency to become elongated, and one specimen was dusted with black scales on the fore-wings. This "raying" had been noticed both in 1930 and 1931. It was thought that the intensity of the markings had perhaps been influenced by these two wet summers. It will be interesting to see if this melanic tendency is repeated or not should the summer of 1932 be a dry one. The specimens have been placed in the Natural History Museum.

He also exhibited a ♀ of *Colias croceus* showing a yellow suffusion in the black margin of the fore-wings instead of the usual yellow spots. The black central spot of the fore-wings was larger than normal, also the orange central spot on the hind-wings. On the underside there were two blackish streaks running from the base of the fore-wings towards the central spot, which was also enlarged; while on the hind-wings a purplish streak ran from the base of the wings through the central spot. The specimen was bred from a number of ova laid by a female captured on the Sussex Downs on Aug. 22nd, 1931. The larva pupated on Dec. 27th, and hatched on March 22nd, 1932. One pupa was killed by the frost in October 1931, after which the breeding cage was brought indoors. Another larva which pupated on Jan. 2nd produced a normal but crippled imago on March 27th.

\* *Insects*, Part I, p. 237.



# THE ENTOMOLOGICAL SOCIETY OF LONDON

---

## THE FELLOWSHIP AND FEES.

Fellows pay an Admission Fee of £3 3s. The Annual Contribution of £2 2s. is due on the first day of January in each year, and is payable in advance.

Fees should be paid to the Treasurer, at 41, Queen's Gate, S.W. 7, and *not to the Secretary.*

Fellows desiring to pay their Annual Contribution through their bankers can obtain an official form of banker's order by applying to the Treasurer.

Fellows whose Contributions for the current year have been paid are entitled to receive the Transactions and Proceedings of the Society free of charge. Further copies may be purchased at reduced prices by applying to the Secretary.

Forms of application for Fellowship, copies of the Bye-laws and the List of Fellows may be obtained from the Secretary.

## MEETINGS AND EXHIBITIONS.

Intending exhibitors are required to send in their names and the nature of their exhibits to the Secretary *before noon* on the day of the meeting, in order that they may be called upon from the chair. Descriptive notes of all exhibits should be handed to the Secretary *at the same meeting* for printing in the Proceedings. If the epidiascope is required, 24 hours' notice must be given.

Fellows resident abroad, or who are otherwise unable to attend, are reminded that any specimens, notes, or observations they may send to the Secretary will be considered by the Council, with a view to exhibition or reading at the meetings of the Society.

## PAPERS AND ILLUSTRATIONS.

Fellows desiring to communicate papers to the Society must send the manuscript of such papers to the Secretary, 41, Queen's Gate, London, S.W. 7, at least fourteen days prior to the date of the meeting at which it is proposed that such papers shall be read. Authors desiring their papers to be published in the Transactions must submit the manuscript, and proposals for illustrations, if any, to the Secretary at least fourteen days before the meeting of the Publication Committee at which it is desired such papers should be considered.

Authors proposing to illustrate their papers should communicate with the Secretary before the drawings are executed. The size of the finished work on plates should be limited to  $7\frac{1}{2}$  ins. by  $4\frac{3}{4}$  ins., after allowing for reduction, if any.

Attention is called to the Instructions to Authors issued with Part I of each volume, which may also be obtained at the Office of the Society. Inattention to these regulations may involve an author in considerable expense.



# MEETINGS

## TO BE HELD IN THE SOCIETY'S ROOMS

41, QUEEN'S GATE, S.W. 7

### 1932

Wednesday, October	...	...	...	...	...	...	5
" "	...	...	...	...	...	...	19
" November	...	...	...	...	...	...	2
" "	...	...	...	...	...	...	16
" December	...	...	...	...	...	...	7

### 1933

" January (Annual Meeting)	...	...	...	...	...	18
" February	...	...	...	...	...	1

*The Chair will be taken at Eight o'clock.*

---

## THE LIBRARY

is open to Fellows, and their friends when accompanying them, daily from 10 a.m. to 6 p.m. (Saturdays, 10 a.m. to 1 p.m.). On the nights of meetings it remains open until 10 p.m. The Library is closed during September.

---

## NOTICE

Fellows are informed that they can have their Transactions bound at the following prices by the Society on application to the Secretary.

Cloth : old size, 4s. 3d. ; new size, 5s.

Buckram : old size, 4s. 9d. ; new size, 5s. 6d.